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Date 01/06/2003 Serial # 091816,148 Priority Application Date N/A
 Your Name CHRISTINE K. ODA Examiner # 69758
 AU 2858 Phone (703) 305-3857 Room CP4-9E08
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Where have you searched so far on this case?

Circle: USPT DWPI EPO Abs JPO Abs IBM TDB

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What relevant art have you found so far? Please attach pertinent citations or

Information Disclosure Statements. Sabins (4,107,017) & R. 20 (4,228,399)

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What is the topic, such as the novelty, motivation, utility, or other specific facets defining the desired focus of this search? Please include the concepts, synonyms, keywords, acronyms, registry numbers, definitions, structures, strategies, and anything else that helps to describe the topic. Please attach a copy of the abstract and pertinent claims.

Sensing corrosion or coating condition or deterioration ^{rust?} using current ^{or degradation}
demands of cathodic areas (Claims 2 & 8).
Measuring potential which corresponds to polarization and measuring
current. Using these to indicate corrosion (or condition or rust or
deterioration or degradation). (Claim 29).
This is used in tanks or ships or anywhere corrosion might be
a problem
Other claims refer to scheduling tanks for maintenance and determining
tanks that need maintenance or predicting.

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 Searcher: Boide 1-7-03 Structure (#) _____
 Searcher Phone: 605 1726 Bibliographic ✓
 Searcher Location: STIC-EIC2800, CP4-9C18 Litigation _____
 Date Searcher Picked Up: 1-7-03 Fulltext _____
 Date Completed: 1-7-03 Patent Family _____
 Searcher Prep/Rev Time: 40 Other Citation
 Online Time: 240

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PALM INTRANET

Day : Tuesday
Date: 1/7/2003
Time: 10:02:05

Inventor Information for 09/816148

Inventor Name	City	State/Country
THOMAS, E. D.	FT. WASHINGTON	MARYLAND
LUCAS, K. E.	UPPER MARLBORO	MARYLAND
SLEBODNICK, PAUL	SPRINGFIELD	VIRGINIA
HOGAN, ELIZABETH A.	UPPER MARLBORO	MARYLAND

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**PALM INTRANET**

Pre-Grant Publication Information

Application Number : 09/816148 Confirmation Number : 7420

Non Pub. Req.: N Non Pub. Rescind Req.: N Early Pub. Req.: N

Filing Status	Projected Bio Pub.	Actual Publication	Exported?
Type Description Pub. Date Ind Status	Pub. Date	Pub. Date Number	
NEW CPUB	09/26/2002 N	PUBLISHED 09/26/2002 US20020135348A1	Y

US CLASSIFICATION

Classification No.	Sub-class No.	Primary Class
324	071200	Y

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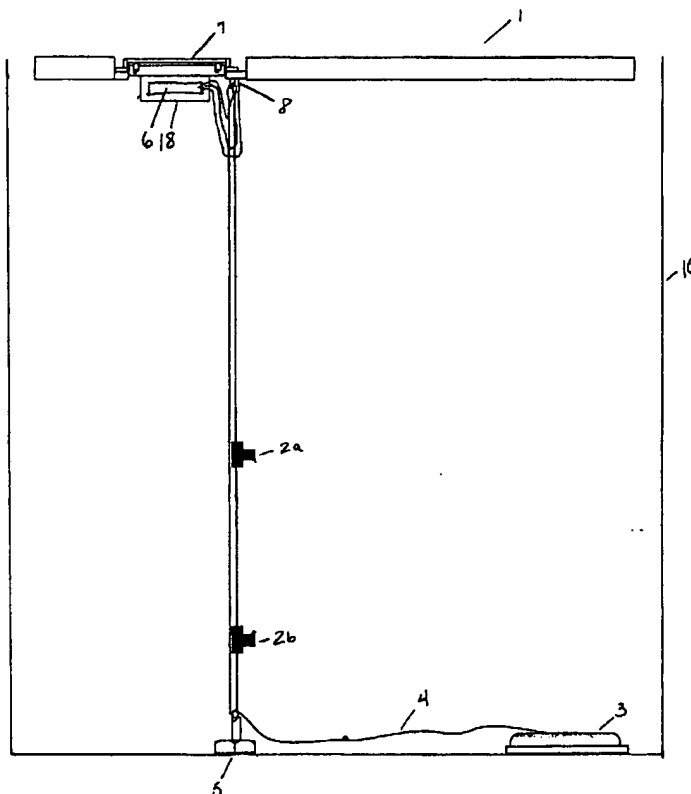
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US 20020135348A1

(19) **United States**(12) **Patent Application Publication** (10) **Pub. No.: US 2002/0135348 A1**
(43) **Pub. Date: Sep. 26, 2002**
Thomas, III et al.(54) **CORROSION SENSOR LOUDSPEAKER FOR
ACTIVE NOISE CONTROL**(76) **Inventors:** E. D. Thomas III, Ft. Washington, MD
(US); K. E. Lucas, Upper Marlboro,
MD (US); Paul Slebodnick,
Springfield, VA (US); Elizabeth A.
Hogan, Upper Marlboro, MD (US)**Correspondence Address:**
Code 1008.2, Naval Research Laboratory
4555 Overlook Ave., S.W.
Washington, DC 20375-5320 (US)(21) **Appl. No.:** 09/816,148(22) **Filed:** Mar. 26, 2001**Publication Classification**(51) **Int. Cl.⁷** **G01N 27/00**
(52) **U.S. Cl.** **324/71.2****ABSTRACT**

A system using tank corrosion sensors to provide for an overall assessment and monitoring of the electro-chemical corrosion and coatings condition in ships' tanks, and particularly in ships' seawater or compensated fuel tanks. The system includes reference half-cells mounted along a suspended cable and one instrumented sacrificial anode at the end of the cable to provide optimal sensing capability within a tank structure. The reference half-cells and the sacrificial anode measure a potential and current output, respectively. Together the measurements provide objective information that can be used to predict corrosion damage and coating deterioration occurring throughout the structure of the tank. The system may be used for an overall assessment and monitoring of the electro-chemical corrosion and coatings condition. In a preferred embodiment, the measurements are stored in a datalogger that is optimally contained within an associated instrument housing. If used with other systems in other tanks, the system may be used to monitor the relative tank condition, trend tank condition changes over time, range tank behavior into three categories and provide a direct analysis methodology for making tank maintenance decisions.



Set	Items	Description
S1	563	AU=(THOMAS E? OR THOMAS, E? OR LUCAS K? OR LUCAS, K? OR SL- EBODNICK P? OR SLEBODNICK, P? OR HOGAN E? OR HOGAN, E?)
S2	2485887	SENSING OR SENSE OR SENSES OR DETECT?
S3	1721360	CORROSION? OR RUST? OR OXIDI?ATION? OR COAT??? OR DETERIOR- ATION? OR DEGRADAT?
S4	536503	TANK? ? OR SHIP? ?
S5	0	S1 AND S2 AND S3 AND S4
S6	28	S1 AND S2 AND S3
S7	3	S6 AND (ANODE? OR CATHOD?)
S8	3	IDPAT (sorted in duplicate/non-duplicate order)
S9	2	IDPAT (primary/non-duplicate records only)
S10	26	S6 NOT S9

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File 350:Derwent WPIX 1963-2002/UD,UM &UP=200301

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File 347:JAPIO Oct 1976-2002/Sep(Updated 030102)

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File 348:EUROPEAN PATENTS 1978-2002/Dec W03

(c) 2002 European Patent Office

File 349:PCT FULLTEXT 1979-2002/UB=20030102,UT=20021226

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INVENTOR

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File 342:Derwent Patents Citation Indx 1978-01/200245

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*File 342: Updates 200160-200209 replaced. See HELP NEWS 342.

Alert feature enhanced for multiple files, etc. See HELP ALERT.

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? s pn=us 4107017			
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\$0.43 TELNET
\$3.97 Estimated cost this search
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S1	3	Serial: TD397

1/9/1

DIALOG(R)File 350:Derwent WPIX

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002216370

WPI Acc No: 1979-15544B /197908

**Appts. measuring effectiveness of anodes in cathodic protection system -
with accuracy maintained for long periods even in oily water**

Patent Assignee: SABINS IND INC (SABI-N)

Inventor: SABINS T C

Number of Countries: 001 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 4107017	A	19780815				197908 B

Priority Applications (No Type Date): US 76740116 A 19761108

Abstract (Basic): US 4107017 A

Electrical measuring appts. measures the effectiveness of anodes in a cathodic protection system protecting a structure against electrochemical corrosion. A voltmeter has a positive terminal connected to the structure and a negative terminal connected to a reference half-cell.

The voltmeter has scales indicating the negative of the electrochemical potential of the structure relative to the voltage of the standard reference half-cell for which each scale is calibrated. The scales are calibrated for copper-copper sulphate, silver-silver chloride and satd. calomel half-cells.

Used for protecting from corrosion ships in salt water, pipes on land, etc. The probe maintains its accuracy for long periods.

Title Terms: APPARATUS; MEASURE; EFFECT; ANODE; CATHODE; PROTECT; SYSTEM; ACCURACY; MAINTAIN; LONG; PERIOD; EVEN; OIL; WATER

Derwent Class: M14; S03

International Patent Class (Additional): C23F-013/00; G01N-027/46

File Segment: CPI; EPI

Manual Codes (CPI/A-N): M14-G

1/9/2

DIALOG(R)File 350:Derwent WPIX

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001586176

WPI Acc No: 1976-20570X /197611

**Ion concn measuring system - is calibrated using meter scale and
auxiliary scale**

Patent Assignee: LEEDS & NORTHRUP CO (LEEN)

Number of Countries: 001 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 3941665	A	19760302				197611 B

Priority Applications (No Type Date): US 71204773 A 19711203; US 68750388 A 19680805

Abstract (Basic): US 3941665 A

Ion concn. measuring system, including an alyzer cell having an electrode which produces a voltage representing the concn. of selected ions in contact with the electrode and a meter having an indicator which moves over a meter scale in response to the voltage on the electrode and an auxiliary scale on the meter movable w.r.t. the fixed

scale, is calibrated. A first sample of unknown conc. ca is supplied to the analyzer and the auxiliary scale moved to a position such that its reference mark corresponds with the position of the indicator when the first sample is in the analyzer cell. A second sample having a concn. which is a known increment C_i above the concn. C_2 is supplied to the cell and the actual concn. of the second sample determined from the position of the indicator w.r.t. the calibration markings on the auxiliary scale. The zero adjustment of the meter is then adjusted so that the indicator reads the value of actual concn. of the meter scale when the second sample is in the analyzer cell.

Title Terms: ION; CONCENTRATE; MEASURE; SYSTEM; CALIBRATE; METER; SCALE; AUXILIARY; SCALE

Derwent Class: J04; S03

International Patent Class (Additional): G01N-027/46

File Segment: CPI; EPI

Manual Codes (CPI/A-N): J04-B01; J04-C04

1/9/3

DIALOG(R)File 350:Derwent WPIX

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001026178

WPI Acc No: 1974-C2186V /197418

Testing acid of alkaline liquid content - galvanic current sensitive meter measures pH value and temp of automobile engine oil and water

Patent Assignee: HARVEY K G (HARV-I)

Number of Countries: 001 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 3806797	A	19740423				197418 B

Priority Applications (No Type Date): US 71148084 A 19710528

Title Terms: TEST; ACID; ALKALINE; LIQUID; CONTENT; GALVANIC; CURRENT; SENSITIVE; METER; MEASURE; PH; VALUE; TEMPERATURE; AUTOMOBILE; ENGINE; OIL; WATER

Derwent Class: S01; S03

International Patent Class (Additional): G01N-027/42; G01R-001/04

File Segment: EPI

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Set	Items	Description
S1	5936807	SENSING OR SENSE OR SENSES OR DETECT? OR SENSOR?
S2	2736353	CORROSION? OR RUST? OR OXIDI?ATION? OR COAT??? OR DETERIOR- ATION? OR DEGRADAT?
S3	706329	TANK? ? OR SHIP? ?
S4	3318	(INSTRUMENT? OR DEVICE? OR APPARATUS?) (3N)ANODE?
S5	386824	CATHOD?
S6	1	S1 AND S2 AND S3 AND S4 AND S5
S7	115	S1 AND S2 AND S3 AND (S4 OR S5)
S8	23	S1(10N)S2(10N)S3(10N) (S4 OR S5)
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File 94:JICST-EPlus 1985-2003/Oct W4
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6/9,K/1 (Item 1 from file: 350)
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003480708

WPI Acc No: 1982-28671E/198214

**Sacrificial anode with warning circuit - actuated by water
short-circuiting contact when anode is used up**

Patent Assignee: HOSSLE W (HOSS-I)

Inventor: HOESSLE W

Number of Countries: 010 Number of Patents: 005

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
WO 8201017	A	19820401				198214 B
DE 3035450	A	19820429	DE 3035450	A	19800917	198218
EP 60289	A	19820922	EP 81902648	A	19810917	198239
EP 60289	B	19860219				198608
DE 3035450	C	19890629				198926

Priority Applications (No Type Date): DE 3035450 A 19800917

Cited Patents: DE 1258063; US 2748250; US 3306109; US 4051007

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
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WO 8201017	A	G	33		
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Designated States (National): DE FI NO US

Designated States (Regional): AT CH FR GB NL

EP 60289	A	G			
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Designated States (Regional): AT CH FR GB LI NL

EP 60289	B	G			
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Designated States (Regional): AT CH FR GB LI NL

Abstract (Basic): WO 8201017 A

A sacrificial anode for the **cathodic corrosion** protection of water **tanks** and storage water heaters acts as a seal between a contact sleeve and a central contact pin. The outside ends of the sleeve and pin are coupled to an optical and/or acoustic signalling system to sound an alarm when the anode has been completely consumed and allows water to short-circuit the sleeve and the pin.

Such a sacrificial anode can be produced at low cost and indicates when it has to be replaced. It allows a heat **sensor** to be added in the same fitment.

Abstract (Equivalent): EP 60289 B

Sacrificial **anode** with consumption indicating **instrument** for water **tanks** and for electric water heaters, characterized by the fact that the fastener of the sacrificial anode shows at the one vessel wall two contact pieces as a kind of electrical conductors, being isolated from each other and penetrating the fastener in an axial direction - this arrangement is made in a way that the ends of the conductors which point to the inside of the vessel, are sealed against the liquid media within the vessel as also against penetration of the liquid media, a result which will be obtained by means of the anode rod which is attached to this front side of the fastener as also characterized by the fact that at their other ends which are accessible at the opposite front side of the fastener and which are to be found with this part of the fastener on the outside of the vessel, a signalling device is connected electrically and which operates in the way of visual and/or acoustic means of communication and that the both contact pieces which penetrate the fastener of the sacrificial **anode**, activate the signalling **device** in case of short circuit due to liquid media of the vessel which did penetrate after the sealing was neutralized. (13pp)

Title Terms: SACRIFICIAL; ANODE; WARNING; CIRCUIT; ACTUATE; WATER; SHORT;
CIRCUIT; CONTACT; ANODE; UP

Derwent Class: M14; Q74; X25

International Patent Class (Additional): C23F-013/00; F24H-009/20;
G01K-001/14

File Segment: CPI; EPI; EngPI

Manual Codes (CPI/A-N): M14-G

Manual Codes (EPI/S-X): X25-R06

...Abstract (Basic): A sacrificial anode for the **cathodic corrosion**
protection of water **tanks** and storage water heaters acts as a seal
between a contact sleeve and a central...

...at low cost and indicates when it has to be replaced. It allows a heat
sensor to be added in the same fitment.

...Abstract (Equivalent): Sacrificial **anode** with consumption indicating
instrument for water **tanks** and for electric water heaters,
characterized by the fact that the fastener of the sacrificial...

...of communication and that the both contact pieces which penetrate the
fastener of the sacrificial **anode** , activate the signalling **device**
in case of short circuit due to liquid media of the vessel which did
penetrate...

?

9/9,K/1 (Item 1 from file: 6)
DIALOG(R) File 6:NTIS
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2220080 NTIS Accession Number: ADD019965/XAB

Corrosion Sensor

(Patent Application)

Lucas, K.

Department of the Navy, Washington, DC.

Corp. Source Codes: 001840000; 110050

Report No.: PAT-APPL-8-816 148

Filed 26 Mar 01 35p

Languages: English Document Type: Patent

Journal Announcement: USGRDR0203

This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS. Product reproduced from digital image.

NTIS Prices: PC N03/MF A04

Country of Publication: United States

A system using tank **corrosion sensors** to provide for an overall assessment and monitoring of the electro-chemical **corrosion** and coatings condition in **ships' tanks**, and particularly in **ships' seawater or compensated fuel tanks**. The system includes reference half cells mounted along a suspended cable and one **instrumented sacrificial anode** at the end of the cable to provide optimal **sensing** capability within a **tank** structure. The reference half-cells and the sacrificial anode measure a potential and current output, respectively. Together the measurements provide objective information that can be used to predict corrosion damage and coating deterioration occurring throughout the structure of the tank. The system may be used for an overall assessment and monitoring of the electro-chemical corrosion and coatings condition.. In a preferred embodiment, the measurements are stored in a datalogger that is optimally contained within an associated instrument housing. If used with other systems in other tanks, the system may be used to monitor the relative tank condition, trend tank condition changes over time, range tank behavior into three categories and provide a direct analysis methodology for making tank maintenance decisions.

Descriptors: *Corrosion; *Patent Applications; Ships; Detectors; Electrochemistry; Coatings; Shipboard; Tanks(Containers); Sea water; Anodes
Identifiers: Electro-chemical corrosion; Corrosion sensors; NTISGPN

Section Headings: 71N (Materials Sciences--Nonferrous Metals and Alloys); 71G (Materials Sciences--Corrosion and Corrosion Inhibition); 47A (Ocean Technology and Engineering--Marine Engineering); 90E (Government Inventions For Licensing--Metallurgy)

A system using tank **corrosion sensors** to provide for an overall assessment and monitoring of the electro-chemical **corrosion** and coatings condition in **ships' tanks**, and particularly in **ships' seawater or compensated fuel tanks**. The system includes reference half cells mounted along a suspended cable and one **instrumented sacrificial anode** at the end of the cable to provide optimal **sensing** capability within a **tank** structure. The reference half-cells and the sacrificial anode measure a potential and current output...

9/9,K/2 (Item 2 from file: 6)
DIALOG(R) File 6:NTIS
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2184172 NTIS Accession Number: ADA382879/XAB

Filing date same as Inventor

**Comprehensive Monitoring and Evaluation of Ballast Tank Coatings
Integrity for Life Prediction and Condition Based Maintenance**

(Memorandum rept)

Lucas, K. E. ; Slebodnick, P. F. ; Hogan, E. A. ; Thomas, E. D. ;
Kaznoff, A. I.

Naval Research Lab., Washington, DC. Materials Science and Technology
Div.

Corp. Source Codes: 000927032; 395818

Report No.: NRL/MR/6136-00-8492

29 Sep 2000 15p

Languages: English

Journal Announcement: USGRDR0103

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NTIS Prices: PC A03/MF A01

Country of Publication: United States

Navy maintenance costs for seawater ballast tank preservation continue to
increase, concurrent with a corresponding growth in the time interval
between overhaul cycles. To reduce the high cost of manned seawater ballast
tank inspections, **corrosion** potential and current **sensors** have been
developed to monitor changes in the **tank** **cathodic** protection levels and
zinc anode current requirements over time. When combined with remote
optical inspection capability, currently under development, a comprehensive
monitoring program will be established. This will provide for in-situ
long-term monitoring of tank corrosion combined with periodic visual
inspections to document tank coating condition. The goal of this effort is
to provide a tank husbandry program for direct monitoring, identification,
and ranking of individual tanks in terms of condition, maintenance or
overhaul requirements, without the need for costly periodic manned
inspections.

Descriptors: Coatings; *Ballast **tanks** ; Service life; Sea water
corrosion ; Materials testing; Visual inspection; **Sensors** ; Maintenance;
Time intervals; High costs; Naval vessels; Monitoring; Navy; Zinc;
Cathodic protection; Sea water; Anodes; In situ analysis

Identifiers: *CBM(Condition based maintenance); *Life prediction;
ROV(Remotely operated vehicle); NTISDODXA

Section Headings: 47A (Ocean Technology and Engineering--Marine
Engineering)

... the time interval between overhaul cycles. To reduce the high cost of
manned seawater ballast **tank** inspections, **corrosion** potential and
current **sensors** have been developed to monitor changes in the **tank**
cathodic protection levels and zinc anode current requirements over time.
When combined with remote optical inspection...

Descriptors: Coatings; *Ballast **tanks** ; Service life; Sea water
corrosion ; Materials testing; Visual inspection; **Sensors** ; Maintenance;
Time intervals; High costs; Naval vessels; Monitoring; Navy; Zinc;
Cathodic protection; Sea water; Anodes; In situ analysis

9/9,K/4 (Item 4 from file: 6)

DIALOG(R)File 6:NTIS

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1951485 NTIS Accession Number: PB96-167580

Corrosion Control of Inter-Hull Spaces

(Final rept)

Kikuta, M. ; Shimko, M. ; Ciscon, D.

Rosenblatt (M.) and Son, Inc., Arlington, VA.
Corp. Source Codes: 088342000
Sponsor: Ship Structure Committee, Washington, DC.
Report No.: SSC-390; SR-1366
Jan 96 118p

Languages: English

Journal Announcement: GRAI9615

Sponsored by Ship Structure Committee, Washington, DC.

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NTIS Prices: PC A07/MF A02

Country of Publication: United States

Contract No.: N00024-87-D-4502

The report expands upon the work conducted by the Naval Sea Systems Command to develop a tank preservation protocol which is intended to achieve a service life of 15 to 20 years. This report focuses on controlling corrosion in the region between the inner and outer hulls in new double hull designs. Information was obtained from classification societies; U.S., European, and Japanese shipyards; coating manufacturers; maritime magazine articles; reports; and the U.S. Navy to determine the current maintenance and repair practices for inter-hull spaces. This information was assimilated and organized into a recommended inter-hull space preservation protocol. The protocol unified individual 'good painting practice' inputs from the various references into a process which is expected to provide 20 years of corrosion protection to the inter-hull space.

Descriptors: Tanker **ships** ; * **Ship** hulls; * **Corrosion** inhibition; Sea water **corrosion** ; **Corrosion** environments; **Corrosion** resistance; **Corrosion** prevention; Welding; Dehumidification; **Detection** ; Inspection; **Sensors** ; Repairs; Painting; Surface preparation; Structural analysis; Maintenance management; **Corrosion** resistant coatings; Protective coatings ; **Cathodic** protection; Metal coatings; Ballast **tanks** ; Marine engineering

Identifiers: *Inter-hull spaces; Double hulls; NTISDOTCG

Section Headings: 47A (Ocean Technology and Engineering--Marine Engineering); 71G (Materials Sciences--Corrosion and Corrosion Inhibition); 71E (Materials Sciences--Coatings, Colorants, and Finishes)

Descriptors: Tanker **ships** ; * **Ship** hulls; * **Corrosion** inhibition; Sea water **corrosion** ; **Corrosion** environments; **Corrosion** resistance; **Corrosion** prevention; Welding; Dehumidification; **Detection** ; Inspection; **Sensors** ; Repairs; Painting; Surface preparation; Structural analysis; Maintenance management; **Corrosion** resistant coatings; Protective coatings ; **Cathodic** protection; Metal coatings; Ballast **tanks** ; Marine engineering

9/9,K/6 (Item 1 from file: 8)
DIALOG(R)File 8:Ei Compendex(R)
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04547004 E.I. No: EIP96110402250

Title: Optimum cathodic protection of ship (optimization of current supply and identification of paint defect location)

Author: Amaya, Kenji; Gouka, Kazunori; Aoki, Shigeru

Source: Nippon Kikai Gakkai Ronbunshu, A Hen/Transactions of the Japan Society of Mechanical Engineers, Part A v 62 n 599 Jul 1996. p 1741-1745

Publication Year: 1996

CODEN: NKGADA ISSN: 0387-5008

Language: Japanese

Document Type: JA; (Journal Article) Treatment: T; (Theoretical)

Journal Announcement: 9701W1

Abstract: A new method for optimizing the cathodic protection of a ship in operation is proposed. First, from electric potential data measured using several sensors located on the wall of the ship, the polarization curve of the painted ship wall is estimated by solving an inverse problem using the boundary element method. Then, using the polarization curve, the optimum current to be supplied to each electrode (several electrodes are located on the ship wall) is determined in such a way that the electric potential of every part of the ship wall becomes lower than a critical value using minimum the necessary electric power. In case when the electric potentials at the sensors change abruptly due to paint damage, the location of the damage is estimated from the potential change by solving another inverse problem, and then the cathodic protection is optimized. An example problem is solved to demonstrate the applicability of the proposed method. (Author abstract) 11 Refs.

Descriptors: **Cathodic** protection; Optimization; Inverse problems; Boundary element method; Defects; Paint; **Ships** ; Electrodes; **Sensors** ; **Corrosion**

Identifiers: Polarization curve; Critical value; Electric potentials; Paint defect

Classification Codes:

704.1 (Electric Components); 921.5 (Optimization Techniques); 921.6 (Numerical Methods); 813.2 (Coating Materials); 672.2 (Noncombat Naval Vessels); 701.1 (Electricity: Basic Concepts & Phenomena)

704 (Electric Components & Equipment); 921 (Applied Mathematics); 813 (Coatings & Finishes); 672 (Naval Vessels); 701 (Electricity & Magnetism)

70 (ELECTRICAL ENGINEERING); 92 (ENGINEERING MATHEMATICS); 81 (CHEMICAL PROCESS INDUSTRIES); 67 (MARINE ENGINEERING)

Descriptors: **Cathodic** protection; Optimization; Inverse problems; Boundary element method; Defects; Paint; **Ships** ; Electrodes; **Sensors** ; **Corrosion**

9/9,K/7 (Item 2 from file: 8)

DIALOG(R)File 8:EI Compendex(R)

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02605003 E.I. Monthly No: EI8807068811

Title: **INTEGRITY ASSURANCE PROGRAM FOR UNDERGROUND TANK SYSTEMS.**

Author: Kroon, David H.

Corporate Source: Corrpro Co, Spring, TX, USA

Source: Materials Performance v 27 n 4 Apr 1988 p 27-31

Publication Year: 1988

CODEN: MTPFBI ISSN: 0094-1492

Language: English

Document Type: JA; (Journal Article) Treatment: A; (Applications); X; (Experimental)

Journal Announcement: 8807

Abstract: The development of an integrity assurance program for existing underground tanks includes soil borings to **detect** contamination, field testing to determine the electric and chemical properties of the **tank** system and surrounding environment, computer modeling to assess the potential for **corrosion** and assign a priority index, precision **tank** testing inventory analysis and repairs, and retrofitting with **cathodic** protection. A program is presented that provides the framework for making decisions that satisfy the requirements for safety, economics, and regulations. (Author abstract)

Descriptors: *TANKS--*Testing; ENVIRONMENTAL PROTECTION; CORROSION; SOILS
--Analysis; FAILURE ANALYSIS; ECONOMICS--Analysis
Identifiers: INTEGRITY ASSURANCE PROGRAM; UNDERGROUND TANK SYSTEMS
Classification Codes:
415 (Metals, Wood & Other Structural Materials); 619 (Pipes, Tanks &
Accessories); 454 (Environmental Engineering)
41 (CONSTRUCTION MATERIALS); 61 (PLANT & POWER ENGINEERING); 45
(POLLUTION & SANITARY ENGINEERING)

Abstract: The development of an integrity assurance program for existing underground tanks includes soil borings to **detect** contamination, field testing to determine the electric and chemical properties of the **tank** system and surrounding environment, computer modeling to assess the potential for **corrosion** and assign a priority index, precision **tank** testing inventory analysis and repairs, and retrofitting with **cathodic** protection. A program is presented that provides the framework for making decisions that satisfy the...

9/9,K/8 (Item 3 from file: 8)
DIALOG(R) File 8:EI Compendex(R)
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02602885 E.I. Monthly No: EI8807069352

Title: **EVALUATION AND MANAGEMENT OF UNDERGROUND TANK SYSTEMS.**

Author: Kroon, David H.

Corporate Source: Corrpro Co, Spring, TX, USA

Source: Transportation Research Record 1113 1987 p 18-23

Publication Year: 1987

CODEN: TRREDM ISSN: 0361-1981 ISBN: 0-309-04465-0

Language: English

Document Type: RC; (Report Chapter) Treatment: E; (Economic/Cost
Data/Market Survey); M; (Management Aspects)

Journal Announcement: 8807

Abstract: Development of an Integrity Assurance Program for existing underground tanks includes soil borings for **detection** of contamination; field testing to determine the electrical and chemical properties of the **tank** system and surrounding environment; computer modeling to assess the potential for **corrosion** and assign a Priority Index; precision **tank** testing, inventory analysis and repairs; and retrofitting with **cathodic** protection. A program is presented that provides the framework for making decisions that satisfy the requirements for safety, economics, and regulations. (Author abstract)

Descriptors: *WATER TANKS AND TOWERS--*Corrosion; TANKS--Steel; STEEL--Cathodic Protection

Identifiers: INTEGRITY ASSURANCE PROGRAM; PRIORITY INDEX

Classification Codes:

446 (Waterworks); 539 (Metals Corrosion & Protection); 415 (Metals, Wood & Other Structural Materials); 545 (Iron & Steel)

44 (WATER & WATERWORKS ENGINEERING); 53 (METALLURGICAL ENGINEERING); 41 (CONSTRUCTION MATERIALS); 54 (METAL GROUPS)

Abstract: Development of an Integrity Assurance Program for existing underground tanks includes soil borings for **detection** of contamination; field testing to determine the electrical and chemical properties of the **tank** system and surrounding environment; computer modeling to assess the potential for **corrosion** and assign a Priority Index; precision **tank** testing, inventory analysis and repairs; and retrofitting with **cathodic** protection. A program is presented that provides the framework for making decisions that satisfy the...

9/9,K/13 (Item 1 from file: 99)
DIALOG(R)File 99:Wilson Appl. Sci & Tech Abs
(c) 2002 The HW Wilson Co. All rts. reserv.

1377861 H.W. WILSON RECORD NUMBER: BAST96035593
Vacuum leak detection for double bottom tanks
Hagen, Ty; Rials, Ron
Materials Performance v. 35 (May '96) p. 40-4
DOCUMENT TYPE: Feature Article ISSN: 0094-1492 LANGUAGE: English
RECORD STATUS: Corrected or revised record

ABSTRACT: Methods for **detecting** vacuum leaks in double bottom aboveground oil storage **tanks** are discussed. In 1992, 10 **tanks** incorporating double bottoms and **cathodic** protection were built for an oil company in Ponca City, Oklahoma. The use of vacuum **detection** allowed the existence of leaks during construction and use to be **detected**. Seven out of 10 **tanks** passed the initial vacuum test, but the other 3 showed that very small leaks led to a noticeable **degradation** in vacuum. The double bottom design minimized **corrosion**, and the methods described allowed for the checking of leaks in both the primary tank bottoms after the tank was made. Details of the design, construction, and testing of the tanks are provided.

DESCRIPTORS: Double wall tanks--Testing; Leak detection;
ABSTRACT: Methods for **detecting** vacuum leaks in double bottom aboveground oil storage **tanks** are discussed. In 1992, 10 **tanks** incorporating double bottoms and **cathodic** protection were built for an oil company in Ponca City, Oklahoma. The use of vacuum **detection** allowed the existence of leaks during construction and use to be **detected**. Seven out of 10 **tanks** passed the initial vacuum test, but the other 3 showed that very small leaks led to a noticeable **degradation** in vacuum. The double bottom design minimized **corrosion**, and the methods described allowed for the checking of leaks in both the primary tank...

9/9,K/14 (Item 1 from file: 94)
DIALOG(R)File 94:JICST-EPlus
(c)2003 Japan Science and Tech Corp(JST). All rts. reserv.

02745553 JICST ACCESSION NUMBER: 96A0137894 FILE SEGMENT: JICST-E
Optimum Cathodic Protection of Ship. Optimization of Current Supply and Identification of Paint Defect Location.
AOKI SHIGERU (1); AMAYA KENJI (1); GOKA KAZUKI (1)
(1) Tokyo Inst. of Technol.
Nippon Kikai Gakkai Keisan Rikigaku Koenkai Koen Ronbunshu, 1995, VOL.8th, PAGE.315-316, FIG.4, REF.2
JOURNAL NUMBER: L0203AAW
UNIVERSAL DECIMAL CLASSIFICATION: 629.5.02
LANGUAGE: Japanese COUNTRY OF PUBLICATION: Japan
DOCUMENT TYPE: Conference Proceeding
ARTICLE TYPE: Short Communication
MEDIA TYPE: Printed Publication
ABSTRACT: The **cathodic** protection is carried out by installing many anodes on the surface of **ship** hull to supply the current in large **ships**. **Sensors** are attached to some places of **ship** hull to measure the potential. It is necessary to **detect** the place where the anticorrosive **coating** is locally damaged from the measurement of potential by the sensors. In this study, an attempt is made to solve

the problems using the boundary element method. A few examples of numerical calculation is shown to confirm the effectiveness of this method.

DESCRIPTORS: ship; cathodic protection; boundary element method; optimization problem; corrosion; coating material (paint); defect; identification; Laplace equation; electric potential distribution
BROADER DESCRIPTORS: electrolytic protection; corrosion prevention; approximation method; problem; recognition; differential equation; equation; formula; distribution
CLASSIFICATION CODE(S): QJ03020I

ABSTRACT: The **cathodic** protection is carried out by installing many anodes on the surface of **ship** hull to supply the current in large **ships**. **Sensors** are attached to some places of **ship** hull to measure the potential. It is necessary to **detect** the place where the anticorrosive **coating** is locally damaged from the measurement of potential by the sensors. In this study, an...

9/9,K/15 (Item 1 from file: 144)
DIALOG(R) File 144:Pascal
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14309451 PASCAL No.: 99-0516269
CP monitoring, installation, and leak detection under existing aboveground storage tanks

MEIER C K; FITZGERALD J H III
Corrpro Companies, Inc., Unknown
Journal: Materials performance, 1999, 38 (10) 22-26
ISSN: 0094-1492 Availability: INIST-10129; 354000087949020020
No. of Refs.: 1 ref.
Document Type: P (Serial) ; A (Analytic)
Country of Publication: United States
Language: English

Inspection often shows that **corrosion** and metal loss occur on **tank** bottoms where **cathodic** protection (CP) has been installed and maintained. Often, improper monitoring is responsible for this. Accurate data can be obtained using directionally drilled under-**tank** tubes. CP can be installed in similar tubes. The life of thinned floors can be extended through CP and leak **detection** per API standards.

English Descriptors: Corrosion; Inspection; Corrosion protection; Cathodic protection; Check; Cistern; Experimental study
French Descriptors: Corrosion; Inspection; Protection corrosion; Protection cathodique; Controle; Citerne; Etude experimentale

Classification Codes: 001D11E03; 240

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Inspection often shows that **corrosion** and metal loss occur on **tank** bottoms where **cathodic** protection (CP) has been installed and maintained. Often, improper monitoring is responsible for this. Accurate data can be obtained using directionally drilled under-**tank** tubes. CP can be installed in similar tubes. The life of thinned floors can be extended through CP and leak **detection** per API standards.

9/9,K/16 (Item 2 from file: 144)

DIALOG(R)File 144:Pascal
(c) 2002 INIST/CNRS. All rts. reserv.

13262782 PASCAL No.: 97-0534803
Improve aboveground storage tank management : Loss prevention/reliability
RAPAPORT D
Jerome Headlands Press, Inc., Jerome, Arizona, United States
Journal: Hydrocarbon processing : (International ed.), 1997, 76 (10)
77-80
ISSN: 0018-8190 CODEN: HYPRAX Availability: INIST-6179;
354000069748600050
No. of Refs.: 6 ref.
Document Type: P (Serial) ; A (Analytic)
Country of Publication: United States
Language: English
REfiners and terminal operators are seeking cost-effective ways to
mitigate leaks from tanks and piping systems.

English Descriptors: Oil industry; Storage tank ; Leak detection ; Safety
; Piping; Corrosion protection; Cathodic protection; Damaging;
Surface storage

French Descriptors: Industrie petroliere; Reservoir stockage; Detection
fuite; Securite; Tuyauterie; Protection corrosion; Protection cathodique;
Endommagement; Stockage surface

Classification Codes: 001D06B02F; 230

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English Descriptors: Oil industry; Storage tank ; Leak detection ; Safety
; Piping; Corrosion protection; Cathodic protection; Damaging;
Surface storage

9/9,K/18 (Item 1 from file: 347)
DIALOG(R)File 347:JAPIO
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02029556 **Image available**
MANUFACTURE OF PLATE FOR ENCLOSED ALKALINE STORAGE BATTERY

PUB. NO.: 61-243656 [JP 61243656 A]
PUBLISHED: October 29, 1986 (19861029)
INVENTOR(s): TAKAHASHI KATSURO
MORINARI RYOSUKE
NISHIMURA MASAMI
SHIMODA MASAKAZU
OGURA TAKAO
APPLICANT(s): SHIN KOBE ELECTRIC MACH CO LTD [000120] (A Japanese Company
or Corporation), JP (Japan)
APPL. NO.: 60-084154 [JP 8584154]
FILED: April 19, 1985 (19850419)
INTL CLASS: [4] H01M-004/26
JAPIO CLASS: 42.9 (ELECTRONICS -- Other)
JOURNAL: Section: E, Section No. 491, Vol. 11, No. 92, Pg. 73, March
24, 1987 (19870324)

ABSTRACT

PURPOSE: To improve the yield of plate by detecting the coating thickness

when coating paste or slurry active material and feeding back to control the moving speed of substrate.

CONSTITUTION: Paste 1a produced by mixing cadmium oxide powder and aqueous solution of carboxy methyl cellulose is fed into a **coating** tank 1 then a punching metal 2 of iron applied with nickel galvanization is fed through feed roller 3 into said **tank** 1 to **coat** the active material to specific thickness through the slit 4b in the slitter 4 thus to produce a **cathode** plate. Contactless chemical **sensor** is employed for **detection** of **coating** thickness and fixed immediately above the slitter to measure the coating thickness prior to drying and set to a **sensor** within regulated weight range for a plate for which the referential level is obtained. Upon variation of -10%, the coating speed is increased by 30mm/mm while upon variation of +10%, the coating speed is decreased by 30mm/mm.

ABSTRACT

... mixing cadmium oxide powder and aqueous solution of carboxy methyl cellulose is fed into a **coating** tank 1 then a punching metal 2 of iron applied with nickel galvanization is fed through feed roller 3 into said **tank** 1 to **coat** the active material to specific thickness through the slit 4b in the slitter 4 thus to produce a **cathode** plate. Contactless chemical **sensor** is employed for **detection** of **coating** thickness and fixed immediately above the slitter to measure the coating thickness prior to drying and set to a **sensor** within regulated weight range for a plate for which the referential level is obtained. Upon...

9/9,K/20 (Item 1 from file: 350)

DIALOG(R) File 350:Derwent WPIX

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013588779 **Image available**

WPI Acc No: 2001-072986/200109

XRAM Acc No: C01-020674

XRPX Acc No: N01-055436

Sensing and checking system for safety condition of tanks, e.g. liquefied petroleum gas-storing tank, has a data recognition and output unit having cathodic protection voltage, and check unit

Patent Assignee: PLINOXOTAR SRL (PLIN-N)

Inventor: MINGOZZI P

Number of Countries: 025 Number of Patents: 002

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
EP 1054078	A2	20001122	EP 99830421	A	19990701	200109 B
IT 1306844	B	20011011	IT 99RM188	A	19990325	200232

Priority Applications (No Type Date): IT 99RM188 A 19990325

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
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EP 1054078	A2	E	11	C23F-013/04	
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Designated States (Regional): AL AT BE CH CY DE DK ES FI FR GB GR IE IT

LI LT LU LV MC MK NL PT RO SE SI

IT 1306844	B	C23F-000/00
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Abstract (Basic): EP 1054078 A2

NOVELTY - A sensing and checking system has a data recognition and output unit having a cathodic protection voltage and a reference value of cathodic protection current, and a check unit (21) having a main storage for the recognition codes and the corresponding threshold value, and a microprocessor for comparing the measured and threshold

values of the protection voltage.

DETAILED DESCRIPTION - A sensing and checking system comprises a data recognition and output unit for cathodic protection voltage and a reference value of a cathodic protection current, having a recognition storage for storing the recognition code of the tank, and a check unit connected to the data recognition and output unit to obtain the measured values of the protection voltage and the reference value. The check unit has main storage for storing recognition codes and the corresponding threshold value for the protection voltage, and a microprocessor for comparing the measured value of the protection voltage with the corresponding threshold value of the protection voltage.

USE - For **sensing** and checking the safety condition of **tanks** housing liquid or gaseous fuel, e.g. liquefied petroleum gas (LPG)-storing **tanks**, comprising a **cathodic corrosion** protection apparatus.

ADVANTAGE - The system provides a complete automation of the checking and of the data storage.

DESCRIPTION OF DRAWING(S) - The figure shows the sensing and checking system.

Check unit (21)

Cable (22)

Waterproof box (C)

pp; 11 DwgNo 4/7

Technology Focus:

TECHNOLOGY FOCUS - MECHANICAL ENGINEERING - Preferred Apparatus: The data recognition and output unit, and check units are connectable by a cable (22). The data recognition and output unit is housed inside a waterproof box (C).

Title Terms: SENSE; CHECK; SYSTEM; SAFETY; CONDITION; TANK; LIQUEFY; PETROL; GAS; STORAGE; TANK; DATA; RECOGNISE; OUTPUT; UNIT; CATHODE; PROTECT; VOLTAGE; CHECK; UNIT

Derwent Class: H03; M14; Q69; S02

International Patent Class (Main): C23F-000/00; C23F-013/04

International Patent Class (Additional): C23F-013/22; F17C-000/00

File Segment: CPI; EPI; EngPI

Manual Codes (CPI/A-N): H03-E; M14-G

Manual Codes (EPI/S-X): S02-K08A

Abstract (Basic):

... For **sensing** and checking the safety condition of **tanks** housing liquid or gaseous fuel, e.g. liquefied petroleum gas (LPG)-storing **tanks**, comprising a **cathodic corrosion** protection apparatus...

9/9,K/21 (Item 2 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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010895503 **Image available**

WPI Acc No: 1996-392454/199639

XRAM Acc No: C96-123427

XRPX Acc No: N96-330782

Cathodic protection system for liquid storage tanks - that allows leak detection and thermal remediation of the soil

Patent Assignee: KENDA W P (KEND-I)

Inventor: KENDA W P

Number of Countries: 001 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
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US 5547311 A 19960820 US 93130622 A 19931001 199639 B

Priority Applications (No Type Date): US 93130622 A 19931001

Patent Details:

Patent No Kind Lan Pg Main IPC Filing Notes

US 5547311 A 10 E02B-013/00

Abstract (Basic): US 5547311 A

System for cathodically protecting a structure (14) in contact with soil and for extracting vapour and liquid contaminants from the soil comprises:

(a) a porous electrically conductive material (16) in contact with the soil;

(b) a power source with the negative terminal in contact with the structure;

(c) a tubing string (20) with a central passageway (70);

(d) at least one perforate screen,

(e) anodes (40) and the screen are aligned axially with the tube string and sit in the conductive material so current flows via the anode, conducting material and soil to the structure.

The anode, screen and tubing string have a common passage to allow vapour and liquid to flow to the surface. The system is positioned in a horizontal well below the structure.

Other systems are also claimed.

USE - Protecting liquid storage tanks from corrosion by cathodic protection, detecting contamination of the soil and thermally remedying the soil.

ADVANTAGE - The system does not require the structure to be removed for the remediation of the soil. Inputting thermal energy into the soil lowers the viscosity of the contaminants and aids in the removal of the contaminants from the soil.

Dwg.1/5

Title Terms: CATHODE; PROTECT; SYSTEM; LIQUID; STORAGE; TANK; ALLOW; LEAK; DETECT; THERMAL; SOIL

Derwent Class: H03; J06; M14; Q42; X25

International Patent Class (Main): E02B-013/00

File Segment: CPI; EPI; EngPI

Manual Codes (CPI/A-N): H03-E; J06-B02; M14-K

Manual Codes (EPI/S-X): X25-R06

...Abstract (Basic): USE - Protecting liquid storage tanks from corrosion by cathodic protection, detecting contamination of the soil and thermally remedying the soil...

9/9,K/23 (Item 4 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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009780119 **Image available**

WPI Acc No: 1994-059972/199408

XRAM Acc No: C94-026818

XRPX Acc No: N94-047259

Ballast water draining device, for oil tank - comprises conducting anode installed in position inside oil tank and means of detecting corrosion protective current flowing inside tank and anode

Patent Assignee: NIPPON BOSHOKU KOGYO KK (NIBO-N)

Number of Countries: 001 Number of Patents: 002

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
JP 6012130	A	19940121	JP 92189923	A	19920624	199408 B

JP 3290205 B2 20020610 JP 92189923 A 19920624 200241

Priority Applications (No Type Date): JP 92189923 A 19920624

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
JP 6012130	A		5	G05D-009/12	
JP 3290205	B2		5	G05D-009/12	Previous Publ. patent JP 6012130

Abstract (Basic): JP 6012130 A

The **device** comprises a conducting **anode** installed in position inside an oil **tank** and means of **detecting** a **corrosion** protective current flowing inside the oil **tank** and the anode installed at a connection between the oil **tank** inside and the anode to compare a current value **detected** by the means with a reference value preset in a current **detector** .

ADVANTAGE - The level of ballast water in the oil tank can be controlled within a certain range to bring sufficient corrosion protecting effect.

Dwg.2/2

Title Terms: BALLAST; WATER; DRAIN; DEVICE; OIL; TANK; COMPRISE; CONDUCTING ; ANODE; INSTALLATION; POSITION; OIL; TANK; DETECT; CORROSION; PROTECT; CURRENT; FLOW; TANK; ANODE

Derwent Class: H03; M14; Q24; Q34; Q39; T06

International Patent Class (Main): G05D-009/12

International Patent Class (Additional): B63B-025/08; B65D-090/22;

B65D-090/48; B67D-005/32; C23F-013/00

File Segment: CPI; EPI; EngPI

Manual Codes (CPI/A-N): H03-E; M14-E

Manual Codes (EPI/S-X): T06-B05

...Abstract (Basic): The **device** comprises a conducting **anode** installed in position inside an oil **tank** and means of **detecting** a **corrosion** protective current flowing inside the oil **tank** and the anode installed at a connection between the oil **tank** inside and the anode to compare a current value **detected** by the means with a reference value preset in a current **detector** .

?

File 342:Derwent Patents Citation Indx 1978-01/200245

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*File 342: Updates 200160-200209 replaced. See HELP NEWS 342.

Alert feature enhanced for multiple files, etc. See HELP ALERT.

Set	Items	Description

? s pn= us	4228399	
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? map		

MAP COMMAND

Menu Mode

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Serial#TD398

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EXS TD398 executes strategy

1 SearchSaves, 12 Search Term(s)

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\$4.04 Estimated cost this search
\$16.01 Estimated total session cost 0.862 DialUnits

File 350:Derwent WPIX 1963-2002/UD,UM &UP=200301

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	1	AX=80-83170C
	1	AX=82-97452E
	1	AX=83-04478K
	1	AX=84-049183
	1	AX=85-223624
	1	AX=97-489706
	1	AX=97-558277
	1	AX=98-131496
	12	AX=70-62836R + AX=78-E5888A + AX=78-28525A + AX=79-J4946B + AX=80-83170C + AX=82-97452E + AX=83-04478K + AX=84-049183 + AX=85-223624 + AX=97-489706 + AX=97-558277 + AX=98-131496
S1	12	Serial: TD398

1/9/1

DIALOG(R)File 350:Derwent WPIX

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011714586 **Image available**

WPI Acc No: 1998-131496 /199813

XRPX Acc No: N98-103808

Ship assisted detection of floating mines using unmanned aircraft with own drive - involves controlling aircraft from ship, in ship travel direction, to scan water in front of ship at distance using television camera, such that and flying speed of aircraft corresponds to speed of ship

Patent Assignee: DIEHL GMBH & CO (DIEH)

Inventor: SCHLEICHER U

Number of Countries: 001 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
DE 19633008	A1	19980219	DE 1033008	A	19960816	199813 B

Priority Applications (No Type Date): DE 1033008 A 19960816

Patent Details:

Patent No	Kind	Lan Pg	Main IPC	Filing Notes
DE 19633008	A1	4	B63G-007/00	

Abstract (Basic): DE 19633008 A

The detection method is carried out with inherent control of the aircraft from the ship, in the travel direction of the ship (1). The aircraft carries a television (TV) camera (13) to scan to sea area in front of the ship. The flying speed of the aircraft (9) corresponds approximately to the speed of the ship. The TV camera field of search (19,23) corresponds at least to the width (2) of the ship.

The data obtained by the camera positioned approximately vertically above the mine (7) being sought, is transmitted from the aircraft (9) to the ship. The evaluation of the data is carried out on the ship. The working sector (21) of the aircraft (9), amounts to about 45 degrees at both sides of the ship longitudinal axis (4).

ADVANTAGE - Cost effective detection facility for floating mines, which has large clear up rate and is less costly than using manned helicopters.

Dwg.1,2/2

Title Terms: SHIP; ASSIST; DETECT; FLOAT; MINE; UNMANNED; AIRCRAFT; DRIVE; CONTROL; AIRCRAFT; SHIP; SHIP; TRAVEL; DIRECTION; SCAN; WATER; FRONT; SHIP; DISTANCE; TELEVISION; CAMERA; FLYING; SPEED; AIRCRAFT; CORRESPOND; SPEED; SHIP

Derwent Class: Q24; S03; W02; W06; W07

International Patent Class (Main): B63G-007/00

International Patent Class (Additional): G01V-003/15; G01V-003/38

File Segment: EPI; EngPI

Manual Codes (EPI/S-X): S03-C02X; S03-C06; W02-F01; W06-B01C9; W06-C01C9; W07-F05

1/9/2

DIALOG(R)File 350:Derwent WPIX

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011581796 **Image available**

WPI Acc No: 1997-558277 /199751

XRAM Acc No: C97-178191

XRPX Acc No: N97-465358

Locating the joints and fractures of underground cast iron gas mains - includes connecting sequential series of underground jointed metallic pipeline sections, locating the centreline, collecting a set of relative linear positions, etc.

Patent Assignee: NEW YORK STATE ELECTRIC & GAS CORP (NYEL-N)

Inventor: PETERMAN D L; PETERMAN E J

Number of Countries: 001 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 5686828	A	19971111	US 95574546	A	19951219	199751 B

Priority Applications (No Type Date): US 95574546 A 19951219

Patent Details:

Patent No	Kind	Lan Pg	Main IPC	Filing Notes
US 5686828	A		9 G01N-027/00	

Abstract (Basic): US 5686828 A

The method for locating the joints and fracture points of underground jointed metallic pipes, comprises (a) connecting a sequential series of underground jointed metallic pipeline sections with joints across a signal generator for passing an audio frequency signal through the sections and joints in series; (b) locating the centreline of sequential series of underground jointed metallic pipe pipeline sections directly above on the surface of the ground to plot a surface centreline; (c) collecting a set of relative linear positions and a corresponding set of measurements of the signal voltage of the audio frequency signal that couples to the surface along the surface centreline; and (d) estimating and equating the location of the joints and fracture points of the underground jointed metallic pipe pipeline to be directly below points on the surface centreline that provide peaks in signal voltage measured in step (c).

Also claimed is a cast-iron-gas-main-pipeline locator system.

USE - Locating the joints and fractures for detecting leakage from underground cast iron gas pipelines.

ADVANTAGE - Joints and fractures of underground jointed metallic lines and pipes and cast iron gas mains are located, which are dependable and accurate and require a minimum of excavation to locate the joints and fractures.

Dwg.1/4

Title Terms: LOCATE; JOINT; FRACTURE; UNDERGROUND; CAST; IRON; GAS; MAINS; CONNECT; SEQUENCE; SERIES; UNDERGROUND; JOINT; METALLIC; PIPE; SECTION; LOCATE; CENTRELINE; COLLECT; SET; RELATIVE; LINEAR; POSITION

Derwent Class: H03; S02; S03; X25

International Patent Class (Main): G01N-027/00

International Patent Class (Additional): G01N-031/08

File Segment: CPI; EPI

Manual Codes (CPI/A-N): H03-B

Manual Codes (EPI/S-X): S02-J06A3; S03-E08A; X25-Y02

1/9/3

DIALOG(R) File 350:Derwent WPIX

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011511791 **Image available**

WPI Acc No: 1997-489706 /199745

XRAM Acc No: C97-156188

XRPX Acc No: N97-407837

Heating offshore pipeline - comprises applying AC current flowing through the electrically conducting pipe that is electrically insulated from the

sea water with a waterproof coating

Patent Assignee: SUMNER G R (SUMN-I)

Inventor: SUMNER G R

Number of Countries: 075 Number of Patents: 008

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
WO 9736063	A1	19971002	WO 97US5078	A	19970325	199745 B
AU 9725532	A	19971017	AU 9725532	A	19970325	199807
GB 2326226	A	19981216	WO 97US5078	A	19970325	199901
			GB 9820934	A	19980925	
NO 9804477	A	19981123	WO 97US5078	A	19970325	199905
			NO 984477	A	19980925	
CN 1222948	A	19990714	CN 97194943	A	19970325	199946
BR 9708269	A	19990803	BR 978269	A	19970325	199952
			WO 97US5078	A	19970325	
US 6049657	A	20000411	US 9614145	A	19960325	200025
			US 96699600	A	19960819	
GB 2326226	B	20001122	WO 97US5078	A	19970325	200061
			GB 9820934	A	19980925	

Priority Applications (No Type Date): US 96699600 A 19960819; US 9614145 P 19960325; US 96704382 A 19960814

Cited Patents: US 3617699; US 3903706; US 3975617; US 4058897; US 4110994; US 4231884; US 5241147

Patent Details:

Patent No Kind Lan Pg Main IPC Filing Notes

WO 9736063 A1 E 47 E03B-007/10

Designated States (National): AL AM AT AU AZ BA BB BG BR BY CA CH CN CU CZ DE DK EE ES FI GB GE HU IL IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MD MG MK MN MW MX NO NZ PL PT RO RU SD SE SG SI SK TJ TM TR TT UA UG US UZ VN

Designated States (Regional): AT BE CH DE DK EA ES FI FR GB GH GR IE IT KE LS LU MC MW NL OA PT SD SE SZ UG

AU 9725532 A Based on patent WO 9736063

GB 2326226 A Based on patent WO 9736063

NO 9804477 A E03B-000/00

BR 9708269 A Based on patent WO 9736063

US 6049657 A E03B-007/10 Provisional application US 9614145

GB 2326226 B E03B-007/10 Based on patent WO 9736063

Abstract (Basic): WO 9736063 A

A marine pipeline (201) comprises: (a) a pipe; (b) a coating that electrically insulates the pipe from sea water; (c) an alternating current heating circuit comprising an AC power supply (212) and the pipe in series with ambient sea water (206) through submerged electrodes; and (d) a thermally insulating coating that may be, but is not necessarily the same as the electrically insulating coating, where the heat generated by the AC current flow in the pipes is for providing flow of fluids through the pipeline.

Also claimed is a method of manufacturing insulated, submarine pipelines.

USE - Application of thermal insulating materials after the pipes are welded together, avoiding various complications arising when laying pipelines in deep water.

ADVANTAGE - The invention can be used to insulate individual pipelines or bundles of pipelines that are installed on a reel, either as the pipe is being installed on a reel, or as it comes off the reel during the lay process.

Dwg.17/23

Title Terms: HEAT; OFFSHORE; PIPE; COMPRISE; APPLY; AC; CURRENT; FLOW; THROUGH; ELECTRIC; CONDUCTING; PIPE; ELECTRIC; INSULATE; SEA; WATER;

WATERPROOF; COATING
Derwent Class: H01; H03; Q42; Q67
International Patent Class (Main): E03B-000/00; E03B-007/10
International Patent Class (Additional): F16L-000/00; H05B-000/00
File Segment: CPI; EngPI
Manual Codes (CPI/A-N): H03-B

1/9/4
DIALOG(R)File 350:Derwent WPIX
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004396746
WPI Acc No: 1985-223624 /198537
XRPX Acc No: N85-167937

**Electrolyte potential measuring appts. - has chamber which contains
electrolytic solution which communicates with porous rim**

Patent Assignee: NICHOLSON J P (NICH-I)
Inventor: NICHOLSON J P
Number of Countries: 010 Number of Patents: 005
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
CA 1191899	A	19850813	CA 422490	A	19830228	198537 B
US 4584530	A	19860422	US 83494068	A	19830512	198619
EP 199867	A	19861105	EP 85303193	A	19850503	198645
EP 199867	B	19900816				199033 N
DE 3579231	G	19900920				199039 N

Priority Applications (No Type Date): CA 422490 A 19830228
Cited Patents: 1.Jnl.Ref; GB 2049943; US 4322805; GB 2078963; US 2974276;
US 4328413

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
CA 1191899	A		28		
EP 199867	A	E			
Designated States (Regional): BE DE FR GB IT LU NL SE					
EP 199867	B				
Designated States (Regional): BE DE FR GB IT LU NL SE					

Abstract (Basic): CA 1191899 A

The wheel electrode comprises a porous rim, a chamber, metal electrode, and elastic porous rim cover. The rim is permeable with electrolytic solution to permit conduction through it.

The chamber contains the electrolytic solution which communicates with the porous rim. The metal electrode is in the chamber in contact with the electrolytic solution for the purpose of sensing electrolytic voltage potentials in the electrolyte. The rim cover is securable about the rim for contacting the electrolyte. The rim cover is adapted to carry an electrically conductive solution to the electrolyte as the rim cover makes contact with the electrolyte.

USE - For device for making an electrical survey of a structure contained in electrolyte.

Abstract (Equivalent): EP 199867 B

A wheel electrode (16) suitable for use with a device (10) for making an electrical survey of a structure contained in electrolyte, by passage of the wheel electrode (16) in rolling electrical contacting relation over surface portions of the electrolyte (14), said wheel electrode comprising: porous rim means (49) permeable with electrolytic solution (56) to permit signal conduction therethrough; a chamber (52) for containing the electrolytic solution, in flow communicating relation with said porous rim means (49); metal electrode means (54) in

said chamber for sensing voltage potentials, in contact with the electrolytic solution; characterized in that there is provided an elastic porous rim cover means (51) positioned about at least a portion of the radially outer periphery (77) of said rim, in conforming and enclosing relation with a recess thereink, and rim cover attachment means (68) removably securing said rim cover means (51) to said rim (49), in use to contain the flow of and to permit percolation of said electrolytic solution to a radially outer surface of said rim cover means, in electrical communicating relation between said electrode means (549 and said electrolyte (14), said rim cover means (51) conforming by temporary deformation thereof, to irregularities in the surface of said electrolyte (14) to provide substantially consistent rolling conductive contact therewith upon passage of said rim cover means therealong. (15pp)

Abstract (Equivalent): US 4584530 A

The wheel electrode includes a chamber which contains electrolytic solution and a porous rim. The rim includes a dielectric rim structure having at least one recess in its axial surface. Apertures pass through the rim structure into the recess, and at least one porous member is securable in the recess and has a predetermined rate of permeation. A metal electrode is positioned in the chamber in contact with the electrolytic solution. An elastic porous rim cover is securable about the rim for making contact with the electrolyte.

The rim cover is adapted to carry an electrically conductive solution to the electrolyte during wheel rotation. Generating mechanisms are spaced about the wheel electrode at predetermined intervals for generating a series of electrical signals as the wheel electrode rotates. A count of these signals is indicative of the distance travelled by the wheel electrode.

USE - Survey of reinforced steel concrete structures. (11pp)a

Title Terms: ELECTROLYTIC; POTENTIAL; MEASURE; APPARATUS; CHAMBER; CONTAIN; ELECTROLYTIC; SOLUTION; COMMUNICATE; POROUS; RIM

Derwent Class: S03

International Patent Class (Additional): G01N-017/00; G01N-027/56;

G01R-027/18

File Segment: EPI

Manual Codes (EPI/S-X): S03-E03B2; S03-F07

1/9/5

DIALOG(R)File 350:Derwent WPIX

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003903638

WPI Acc No: 1984-049183 /198408

XRPX Acc No: N84-037286

Pipeline inspection and maintenance method - by moving magnetic field responsive device along pipeline route and correlating identifiable features with those previously recorded

Patent Assignee: FRENCH H A (FREN-I)

Inventor: FRENCH H A

Number of Countries: 001 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 4430613	A	19840207	US 80172796	A	19800728	198408 B

Priority Applications (No Type Date): US 80172796 A 19800728

Patent Details:

Patent No	Kind	Lan Pg	Main IPC	Filing Notes
US 4430613	A	5		

Abstract (Basic): US 4430613 A

A magnetometer is moved along the route of a pipeline and the output of the magnetometer is observed to identify pipeline characteristics. Used with a buried pipeline the magnetometer is moved over the surface of the overlay to identify and locate girth welds, pipeline fittings and accoutrements, changes in pipeline metallurgy such as occur with large hard spots and changes in wall thickness as occur in extensive and severe corrosion.

Similar functions can be performed with underwater pipelines using a magnetometer which is located in an appropriate container and trolled along the route of the pipeline by a vessel. The pipeline is formed of pipe sections which are arranged in an identifiable pattern according to their magnetic characteristics to facilitate inspection and maintenance.

0/2

Title Terms: PIPE; INSPECT; MAINTAIN; METHOD; MOVE; MAGNETIC; FIELD; RESPOND; DEVICE; PIPE; ROUTE; CORRELATE; IDENTIFY; FEATURE; RECORD

Derwent Class: S01; S03; X25

International Patent Class (Additional): G01N-027/72; G01R-033/12

File Segment: EPI

Manual Codes (EPI/S-X): S01-E02; S03-E11A; S03-E14C; X25-X

1/9/6

DIALOG(R) File 350:Derwent WPIX

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003644465

WPI Acc No: 1983-04478K /198302

XRAM Acc No: C83-004449

XRFX Acc No: N83-008581

Electrical surveying offshore structures with distance correction - detects and compensates for line currents and minimises holidays in insulated wire

Patent Assignee: HARCO CORP (HARC-N)

Inventor: MILLER M L; WELDON C P; WOLFSON S L

Number of Countries: 001 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 4365191	A	19821221				198302 B

Priority Applications (No Type Date): US 80125885 A 19800229

Patent Details:

Patent No	Kind	Lan Pg	Main IPC	Filing Notes
US 4365191	A	11		

Abstract (Basic): US 4365191 A

A method is for electrical surveying of offshore metal structures and involves measuring the electrical potential difference between the structure and an electrolyte, such as sea water and/or the sea bottom, in which the structure is contained. Such measurements are made at approximated recorded distance locations along the structure and the approximate distance informations is corrected based on periodically taken accurate distance measurements.

Provision is also made to correct data for line currents in the structure and the effectiveness of an electrically insulating member connected in the structure can be examined.

The method enables a correlation to be made of the electric potential difference measurements taken in the survey accurately with position along the structure. Also, line currents in the structure are detected and compensated for. The number of holidays in an insulated

wire are also minimised. The method enables the effectiveness of cathodic protection to be determined.
Title Terms: ELECTRIC; SURVEYING; OFFSHORE; STRUCTURE; DISTANCE; CORRECT; DETECT; COMPENSATE; LINE; CURRENT; MINIMISE; INSULATE; WIRE
Derwent Class: H03; S01; S03; X25
International Patent Class (Additional): G01R-031/02; G01V-003/15
File Segment: CPI; EPI
Manual Codes (CPI/A-N): H03-B; H03-D
Manual Codes (EPI/S-X): S01-G04; S03-C02A; X25-R06

1/9/7
DIALOG(R)File 350:Derwent WPIX
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003549455
WPI Acc No: 1982-97452E /198245
Test system for pipe-to-soil potential of a buried pipeline - has current interrupters and clock reference unit connected to spaced-apart rectifiers

Patent Assignee: SAENZ A (SAEN-I)
Inventor: SAENZ A
Number of Countries: 001 Number of Patents: 001
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 4356444	A	19821026				198245 B

Priority Applications (No Type Date): US 80216385 A 19801215
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
US 4356444	A		8		

Abstract (Basic): US 4356444 A

Appts. for testing pipe-to-soil potential of a buried pipeline having rectifiers electrically connected to it along its length to apply electrical potential to the pipe comprises synchronous rectifier current interrupters, a clock reference unit for synchronising each interrupter and a portable sensing device for producing signals indicative of pipe-to-soil potential of a pipe. A synchronous ON/OFF pipe-to-soil potential demultiplexer is electrically connected to a recording device for electronically separating on and off potentials, and electrically connected to the clock reference unit for synchronising the demultiplexer with the reference unit and interrupters.

Measuring the pl polarised potential along a buried steel, cast iron or ductile iron pipeline.

2/6

Title Terms: TEST; SYSTEM; PIPE; SOIL; POTENTIAL; BURY; PIPE; CURRENT; INTERRUPT; CLOCK; REFERENCE; UNIT; CONNECT; SPACE; APART; RECTIFY
Derwent Class: H03; M14; S01; X25
International Patent Class (Additional): G01R-031/12
File Segment: CPI; EPI
Manual Codes (CPI/A-N): H03-B; M14-G
Manual Codes (EPI/S-X): S01-G03; X25-R06

1/9/8
DIALOG(R)File 350:Derwent WPIX
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002565146

WPI Acc No: 1980-83170C /198047

Inspecting electric insulation on pipes immersed in sea-water - via
electric monitor which also measures efficiency of cathodic protection
(BR 21.1.80)

Patent Assignee: SECCO SOC CONT CORR (SECC-N); SOC ETUD CONTRE COR (CORR-N)

Inventor: HEUZE B

Number of Countries: 005 Number of Patents: 006

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
FR 2448148	A	19801003				198047 B
BR 8000558	A	19801021				198047
GB 2046915	A	19801119				198047
US 4357573	A	19821102				198246
GB 2046915	B	19830505				198318
IT 1128005	B	19860528				198742

Priority Applications (No Type Date): FR 792644 A 19790201

Abstract (Basic): FR 2448148 A

The pipes are kept at a different potential to the seawater and an assembly of electrodes is moved through the seawater above the pipe to indicate any defects in the insulating coating on the pipe, and also to monitor the efficiency of any anodes used for cathodic protection of the pipe.

The pref. appts. consists of a board (1) made of electric insulation material and on which three equidistance electrodes are located and are connected to a millivoltmeter. The board is pulled along the pipe, e.g. by a ship, which receives electric signals indicating the presence of any defects in the corrosion protection systems. For example, the inspection of pipelines carrying gaseous or liq. hydrocarbons.

Title Terms: INSPECT; ELECTRIC; INSULATE; PIPE; IMMERSE; SEA; WATER;
ELECTRIC; MONITOR; MEASURE; EFFICIENCY; CATHODE; PROTECT

Derwent Class: H03; M14; Q67; S02; S03

International Patent Class (Additional): C23F-013/00; F16L-058/00;
G01M-019/00; G01N-017/00; G01N-027/00; G01R-031/02; G01V-003/15

File Segment: CPI; EPI; EngPI

Manual Codes (CPI/A-N): H03-B; H03-D; M14-J

Manual Codes (EPI/S-X): S02-J09; S03-E02X

1/9/9

DIALOG(R)File 350:Derwent WPIX

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002165000

WPI Acc No: 1979-J4946B /197940

Offshore pipeline corrosion electrical surveying system - has reference
electrode transported by boat close to pipeline and measures potential
difference between this and reference location

Patent Assignee: HARCO CORP (HARC-N); MARCO CORP (MARC)

Inventor: MILLER M L; RIZZO F E; WELDON C

Number of Countries: 003 Number of Patents: 004

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
GB 2017306	A	19791003				197940 B
NO 7900645	A	19790924				197942
US 4228399	A	19801014				198044
GB 2017306	B	19821124				198247

Priority Applications (No Type Date): US 78881737 A 19780227

Abstract (Basic): GB 2017306 A

In the offshore pipeline electrical corrosion survey, the pipeline (10) is initially located and marked e.g. by buoys (22).

The length of the pipeline is transversed by a boat (20) towing a reference electrode (24) in close proximity to the pipeline. The boat carries a supply of wire (32) having one end electrically and mechanically connected to the pipeline at a reference location (34).

The wire is played out along the length of the pipeline through a distance measuring device (36). The potential difference between the reference electrode and the pipeline is measured and recorded either continuously or at spaced test locations along the length of the pipeline.

Abstract (Equivalent): GB 2017306 B

In the offshore pipeline electrical corrosion survey, the pipeline (10) is initially located and marked e.g. by buoys (22).

The length of the pipeline is transversed by a boat (20) towing a reference electrode (24) in close proximity to the pipeline. The boat carries a supply of wire (32) having one end electrically and mechanically connected to the pipeline at a reference location (34).

The wire is played out along the length of the pipeline through a distance measuring device (36). The potential difference between the reference electrode and the pipeline is measured and recorded either continuously or at spaced test locations along the length of the pipeline.

Title Terms: OFFSHORE; PIPE; CORROSION; ELECTRIC; SURVEYING; SYSTEM; REFERENCE; ELECTRODE; TRANSPORT; BOAT; CLOSE; PIPE; MEASURE; POTENTIAL; DIFFER; REFERENCE; LOCATE

Derwent Class: S02; S03

International Patent Class (Additional): G01M-000/00; G01N-017/00;

G01N-027/26; G01R-031/00; G01V-003/15

File Segment: EPI

1/9/10

DIALOG(R) File 350:Derwent WPIX

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002015495

WPI Acc No: 1978-28525A /197815

Surveying cathodically protected, immersed metallic structure - using variations between measured potential differences without direct electrical contact with the structure

Patent Assignee: MORGAN BERKELEY CO (MORG-N)

Inventor: MORGAN J H

Number of Countries: 002 Number of Patents: 002

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 4078510	A	19780314				197815 B
GB 1512161	A	19780524				197821

Priority Applications (No Type Date): GB 761002 A 19760112

Abstract (Basic): US 4078510 A

Method of conveying a cathodically protected metallic structure at least partially immersed in a liquid without making direct electrical contact with the structure comprises measuring the potential differences between a point in the liquid adjacent a metallic element electrically connected to the structure and test points in the liquid adjacent the metallic structure. The metallic element is of known

electrolytic potential relative to the liquid. The varying level of protection about the structure is determined from the variations between the potential differences.

Used in surveying undersea pipelines which have sacrificial anodes attached at regular intervals along their lengths. Method obviates the necessity of making direct electrical contact with the structure. The test electrode and reference electrode may be towed by a vessel moving on the surface of the sea. The position of the pipeline relative to the electrodes may be determined and the steering of the vessel may be compensated so as to ensure that the vessel follows the route of the pipeline.

Title Terms: SURVEYING; CATHODICALLY; PROTECT; IMMERSE; METALLIC; STRUCTURE
; VARIATION; MEASURE; POTENTIAL; DIFFER; DIRECT; ELECTRIC; CONTACT;
STRUCTURE

Derwent Class: M14; Q24; S01; S03

International Patent Class (Additional): B63H-025/00; G01N-017/00;
G01R-031/02

File Segment: CPI; EPI; EngPI

Manual Codes (CPI/A-N): M14-G

1/9/11

DIALOG(R)File 350:Derwent WPIX

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001916637

WPI Acc No: 1978-E5888A /197824

Determn. of potential difference between pipe and soil - uses
copper-copper sulphate half cell connected between test station and soil
probe, to check PD for corrosion protection

Patent Assignee: COMMONWEALTH SEAGER (COMM-N); HARCO CORP (HARC-N)

Inventor: SEAGER W H

Number of Countries: 002 Number of Patents: 002

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
CA 1032223	A	19780530				197824 B
US 4151458	A	19790424				197919

Priority Applications (No Type Date): US 77820379 A 19770729

Abstract (Basic): CA 1032223 A

The appts. for conducting the closely-spaced survey comprises a coper-copper sulphate half cell or similar reference electrode carried on the lower end of a cane which may be brought into contact with the soil proximate the pipeline at the various test points. The appts. is connected to a light weight wire connected to the pipeline at a test lead station. Because of its light weight, the wire and reel may be carried by a surveyor and played out behind him as he traverses the length of the pipe.

As the wire is played out, it drives a distance measuring unit carried by the surveyor for measuring the distance from the test station and between each test location. At each test location, the surveyor contacts the copper-copper sulphate half cell or the like to the ground above the pipe and the potential measurement between the wire and the half cell is made with a suitable meter also carried along with the surveyor. Thus only one separator is required.

Title Terms: DETERMINE; POTENTIAL; DIFFER; PIPE; SOIL; COPPER; COPPER;
SULPHATE; HALF; CELL; CONNECT; TEST; STATION; SOIL; PROBE; CHECK;
CORROSION; PROTECT

Derwent Class: S01; S03

International Patent Class (Additional): G01R-031/02; G01V-003/00

File Segment: EPI

1/9/12

DIALOG(R)File 350:Derwent WPIX

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000725569

WPI Acc No: 1970-62836R /197035

Tracking underwater pipelines and detecting - flaws in their coatings

Patent Assignee: NORTH AMERICAN ROCKWELL (ROCW)

Number of Countries: 001 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 3526831	A					197035 B

Priority Applications (No Type Date): US 68777816 A 19681121

Abstract (Basic): US 3526831 A

Flaws are detected in the coating of an underwater pipeline by passing through an a.c. current of frequency between 10 and 3,000 cycles per second, moving a submarine over the pipeline guided by a position sensor actuated by the alternating magnetic field induced and detecting the leakage current by a pair of current detectors on the submarine, the speed and course of which are monitored and plotted so that the location of the leakage current can also be plotted.

Title Terms: TRACK; UNDERWATER; PIPE; DETECT; FLAW; COATING

Derwent Class: H03; S01

International Patent Class (Additional): G01R-031/00

File Segment: CPI; EPI

Manual Codes (CPI/A-N): H03-B; H03-D

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